**GCSE Mathematics (1MA1)**

**Themed papers – Statistical diagrams: Scatter Graphs**

**Compiled from student-friendly mark schemes**

**Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn’t show follow-through marks (marks that are awarded despite errors being made) or special cases.**

**It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.**

**NOTES ON MARKING PRINCIPLES**

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| --- |
| **Guidance on the use of codes within this mark scheme** |
| M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.A1 – accuracy mark. This mark is generally given for a correct answer following correct working.B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer). |

**Question 1 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  |  | M1 | This mark is given for drawing a suitable line of best fit |
| A1 | This mark is given for an answer in the range 30 to 40 |

**Question 2 (Total 5 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | (10, 19) | B1 | This mark is given for the correct answer only |
| (b) | Positive (correlation) | C1 | This mark is given for a correct comment |
| (c) | Line drawn from 16.4 up to (16.4, *y*) | M1 | This mark is given for an appropriate line of best fit drawn, or a point marked at (16.4, *y*) or a vertical line |
| Answer in the range 12 – 13 | A1 | This mark is given for an answer of hours in the range 12 to 13 |
| (d) | Yes, the graph appears to justify this since the majority of points for high temperature appear when there are more hours of sunshine (positive correlation) | C1 | This mark is given for a correct explanation |

**Question 3 (Total 2 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
|  | The line of best fit is not in the correct position | C1 | This mark is given for correct statement |
| The scale is incorrect (140 should be 150) | C1 | This mark is given for correct statement |

**Question 4 (Total 3 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | Negative | B1 | This mark is given for the correct answer only |
| (b) | The point is far away from the line of best fit | C1 | This mark is given for a correct explanation |
| (c) | Debbie’s conclusion is unreliable because the point is outside the range of the scatter diagram | C1 | This mark is given for a correct explanation |

**Question 5 (Total 6 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a)(i) |  | B1 | This mark is given for a line of best fit drawn on the scatter diagram |
| 490 minutes | B1 | This mark is given for an answer in the range 480 – 500 |
| (a)(ii) | Data is only a sampleLine of best fit can varyScale cannot be read exactly | C1 | This mark is given for one of the possible reasons shown |
| (b)(i) |  | M1 | This mark is given for a method to find the gradient of the line of best fit |
|  = 9.5 | A1 | This mark is given for an answer in the range 9.4 – 9.8 |
| (b)(ii) | Speed in miles per minute | C1 | This mark is given for a correct interpretation of the line of best fit |

**Question 6 (Total 4 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **Working or answer an examiner might expect to see** | **Mark** | **Notes** |
| (a) | e.g. rain, school day, measurement error | C1 | This mark is given for a correct reason for low attendance in hot weather |
| (b) | Positive | B1 | This mark is given for the correct answer only |
| (c) |  | B1 | This mark is given for answer in range 15 – 25 |
| (d) | e.g. data out of range, number of children will be negative | C1 | This mark is given for a correct explanation of why it would not be sensible to use the scatter graph  |

**Performance data:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Q** | **Taken from**  | **Total Marks available** | **TOPIC** | **Spec Ref** | **AO** | **% Mean marks** | **Edexcel mean averagesMarks of candidates who achieved grade:** |
| **Q** | **Series** | **Paper** | **ALL** | **5** | **4** | **3** | **2** | **1** | **U** |
| 1 | 24 | Nov-19 | 3F | 2 | Statistics | S6 | 2 | **79** | 1.58 | 1.86 | 1.78 | 1.61 | 1.26 | 0.83 | 0.24 |
| 2a | 21a | Jun-17 | 1F | 1 | Statistics | S4 | 2 | **88** | 0.88 | 0.98 | 0.96 | 0.93 | 0.86 | 0.71 | 0.35 |
| 2b | 21b | Jun-17 | 1F | 1 | Statistics | S6 | 2 | **69** | 0.69 | 0.94 | 0.88 | 0.76 | 0.55 | 0.27 | 0.07 |
| 2c | 21c | Jun-17 | 1F | 2 | Statistics | S6 | 2 | **77** | 1.54 | 1.87 | 1.8 | 1.67 | 1.42 | 0.92 | 0.36 |
| 2d | 21d | Jun-17 | 1F | 1 | Statistics | S6 | 2 | **77** | 0.77 | 0.92 | 0.88 | 0.83 | 0.72 | 0.49 | 0.18 |
| 3 | 21 | Nov-18 | 2F | 2 | Statistics | S6 | 2 | **53** | 1.05 | 1.26 | 1.21 | 1.06 | 0.87 | 0.59 | 0.28 |
| 4a | 19a | Jun-18 | 3F | 1 | Statistics | S6 | 1 | **63** | 0.63 | 0.91 | 0.83 | 0.69 | 0.48 | 0.22 | 0.06 |
| 4b | 19b | Jun-18 | 3F | 1 | Statistics | S6 | 2 | **33** | 0.33 | 0.54 | 0.45 | 0.36 | 0.24 | 0.09 | 0.02 |
| 4c | 19c | Jun-18 | 3F | 1 | Statistics | S6 | 2 | **9** | 0.09 | 0.16 | 0.12 | 0.09 | 0.08 | 0.05 | 0.01 |
| 5ai | 19ai | Mock Set 3  | 2F | 2 | − | − | − | **−** | − | − | − | − | − | − | − |
| 5aii | 19aii | Mock Set 3  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 5bi | 19bi | Mock Set 3  | 2F | 2 | − | − | − | **−** | − | − | − | − | − | − | − |
| 5bii | 19bii | Mock Set 3  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 6a | 25a | Mock Set 1  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 6b | 25b | Mock Set 1  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 6c | 25c | Mock Set 1  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
| 6d | 25d | Mock Set 1  | 2F | 1 | − | − | − | **−** | − | − | − | − | − | − | − |
|  |  |  |  | **22** |  |  |  |  | **7.56** | **9.44** | **8.91** | **8** | **6.48** | **4.17** | **1.57** |